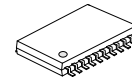


**U74HC374****CMOS IC****OCTAL EDGE-TRIGGERED
D-TYPE FLIP-FLOPS
WITH 3-STATE OUTPUTS****■ DESCRIPTION**

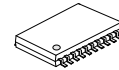
The UTC **U74HC374** is an octal edge-triggered D-type flip-flop with 3-state outputs and 8 channels.

■ FEATURES

- * Operate from 2V to 6V
- * Max t_{PD} of 46ns at 4.5 V, $T_A = 25^\circ\text{C}$
- * Max I_{CC} of 8 μA , $T_A = 25^\circ\text{C}$
- * Typical $V_{OL} < 0.17\text{V}$ at $V_{CC} = 4.5\text{V}$, $I_{OUT} = -6\text{mA}$, $T_A = 25^\circ\text{C}$
- * Typical $V_{OH} > 4.3\text{V}$ at $V_{CC} = 4.5\text{V}$, $I_{OUT} = 6\text{mA}$, $T_A = 25^\circ\text{C}$



SOP-20



SSOP-20

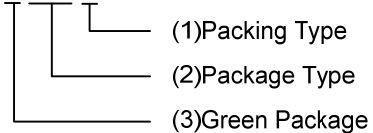


TSSOP-20

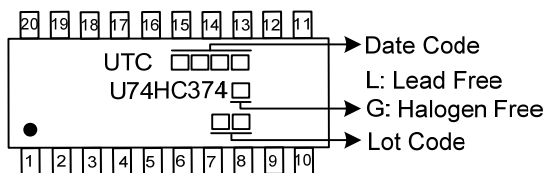
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC374L-S20-R	U74HC374G-S20-R	SOP-20	Tape Reel
U74HC374L-R20-R	U74HC374G-R20-R	SSOP-20	Tape Reel
U74HC374L-P20-R	U74HC374G-P20-R	TSSOP-20	Tape Reel

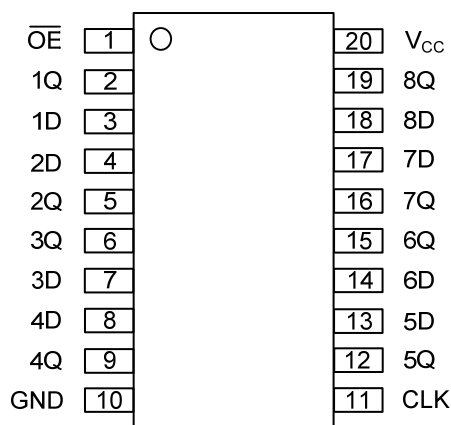
U74HC374G-S20-R



- (1) R: Tape Reel
- (2) S20: SOP-20, R20: SSOP-20, P20: TSSOP-20
- (3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

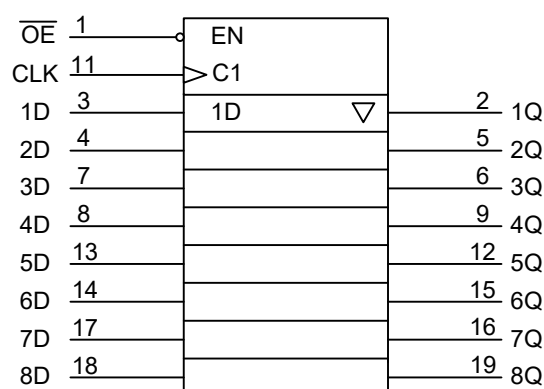
PIN CONFIGURATION



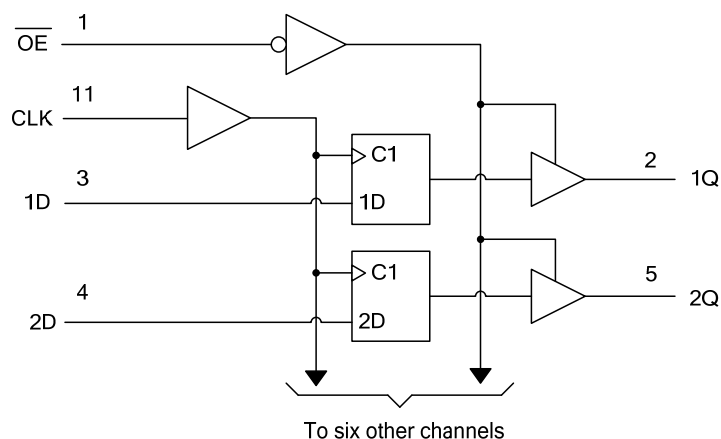
FUNCTION TABLE

INPUTS($\overline{OE}$)	INPUTS(CLK)	INPUTS(D)	OUTPUT(Q)
L	$\uparrow$	H	H
L	$\uparrow$	L	L
L	L/H	X	Q0
H	X	X	Z

LOGIC SYMBOL



LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ +7	V
V_{CC} or GND Current	I_{CC}	± 70	mA
Output Current	I_{OUT}	± 35	mA
Input Clamp Current	I_{IK}	± 20	mA
Output Clamp Current	I_{OK}	± 20	mA
Storage Temperature	T_{STG}	-65 ~ + 150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ RECOMMENDED OPERATING CONDITIONS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2	5	6	V
High-Level Input Voltage	V_{IH}	$V_{CC}=2V$	1.5			V
		$V_{CC}=4.5V$	3.15			V
		$V_{CC}=6V$	4.2			V
Low-Level Input Voltage	V_{IL}	$V_{CC}=2V$			0.5	V
		$V_{CC}=4.5V$			1.35	V
		$V_{CC}=6V$			1.8	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}	High or low state	0		V_{CC}	V
Input Rise or Fall Times	t_R, t_F	$V_{CC}=2V$	0		1000	ns
		$V_{CC}=4.5V$	0		500	ns
		$V_{CC}=6V$	0		400	ns
Operating Temperature	T_A		-40		+125	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOP-20	58	°C /W
	SSOP-20	75	
	TSSOP-20	83	

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage High-Level	V_{OH}	$V_{CC}=2V, I_{OH}=-20\mu A$	1.9	1.999		V
		$V_{CC}=4.5V, I_{OH}=-20\mu A$	4.4	4.499		V
		$V_{CC}=6V, I_{OH}=-20\mu A$	5.9	5.999		V
		$V_{CC}=4.5V, I_{OH}=-6mA$	3.98	4.3		V
		$V_{CC}=6V, I_{OH}=-7.8mA$	5.48	5.8		V
Output Voltage Low-Level	V_{OL}	$V_{CC}=2V, I_{OL}=20\mu A$		0.002	0.1	V
		$V_{CC}=4.5V, I_{OL}=20\mu A$		0.001	0.1	V
		$V_{CC}=6V, I_{OL}=20\mu A$		0.001	0.1	V
		$V_{CC}=4.5V, I_{OL}=6mA$		0.17	0.26	V
		$V_{CC}=6V, I_{OL}=7.8mA$		0.15	0.26	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND		± 0.1	± 100	nA
3-State Leakage Current	I_{OZ}	$V_{CC}=6V, V_{OUT}=V_{CC}$ or GND		± 0.01	± 0.5	μA
Quiescent Supply Current	I_{CC}	$V_{CC}=6V, V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			8	μA
Input Capacitance	C_I	$V_{CC}=2V \sim 6V$		3	10	pF

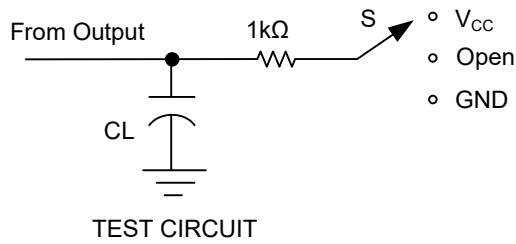
■ **SWITCHING CHARACTERISTICS** (See TEST CIRCUIT AND WAVEFORMS)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
From CLK to Q	t_{PLH}/t_{PHL}	$C_L = 50\text{pF}$	$V_{CC}=2\text{V}$	63	180	ns
			$V_{CC}=4.5\text{V}$	17	36	ns
			$V_{CC}=6\text{V}$	15	31	ns
		$C_L = 150\text{ pF}$	$V_{CC}=2\text{V}$	80	230	ns
			$V_{CC}=4.5\text{V}$	22	46	ns
			$V_{CC}=6\text{V}$	19	39	ns
From $\overline{\text{OE}}$ to Q	t_{PZL}/t_{PZH}	$C_L = 50\text{pF}$	$V_{CC}=2\text{V}$	60	150	ns
			$V_{CC}=4.5\text{V}$	16	30	ns
			$V_{CC}=6\text{V}$	14	26	ns
		$C_L = 150\text{ pF}$	$V_{CC}=2\text{V}$	70	200	ns
			$V_{CC}=4.5\text{V}$	25	40	ns
			$V_{CC}=6\text{V}$	22	34	ns
From $\overline{\text{OE}}$ to Q	t_{PLZ}/t_{PHZ}	$C_L = 50\text{pF}$	$V_{CC}=2\text{V}$	36	150	ns
			$V_{CC}=4.5\text{V}$	17	30	ns
			$V_{CC}=6\text{V}$	16	26	ns
Any Q	t_T	$C_L = 50\text{pF}$	$V_{CC}=2\text{V}$	28	60	ns
			$V_{CC}=4.5\text{V}$	8	12	ns
			$V_{CC}=6\text{V}$	6	10	ns
		$C_L = 150\text{ pF}$	$V_{CC}=2\text{V}$	45	210	ns
			$V_{CC}=4.5\text{V}$	17	42	ns
			$V_{CC}=6\text{V}$	13	36	ns
Maximum Clock Frequency	f_{MAX}	$C_L = 50\text{pF}$	$V_{CC}=2\text{V}$	6	12	MHz
			$V_{CC}=4.5\text{V}$	30	60	MHz
			$V_{CC}=6\text{V}$	35	70	MHz
		$C_L = 150\text{pF}$	$V_{CC}=2\text{V}$	6	12	MHz
			$V_{CC}=4.5\text{V}$	30	60	MHz
			$V_{CC}=6\text{V}$	35	70	MHz
Clock Frequency	f_{CLOCK}	$V_{CC}=2\text{V}$			6	MHz
		$V_{CC}=4.5\text{V}$			30	MHz
		$V_{CC}=6\text{V}$			35	MHz
Pulse Width	t_W	$V_{CC}=2\text{V}$	80			ns
		$V_{CC}=4.5\text{V}$	16			ns
		$V_{CC}=6\text{V}$	14			ns
Setup Time	t_{SU}	$V_{CC}=2\text{V}$	100			ns
		$V_{CC}=4.5\text{V}$	20			ns
		$V_{CC}=6\text{V}$	17			ns
Hold Time	t_H	$V_{CC}=2\text{V}$	10			ns
		$V_{CC}=4.5\text{V}$	5			ns
		$V_{CC}=6\text{V}$	5			ns

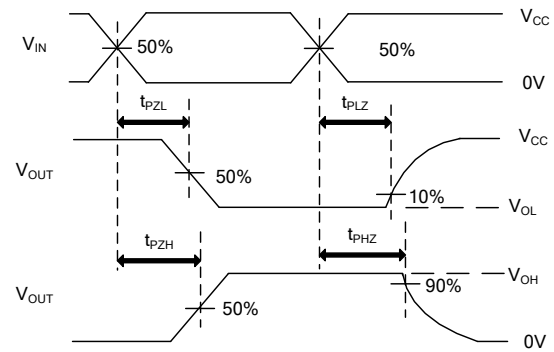
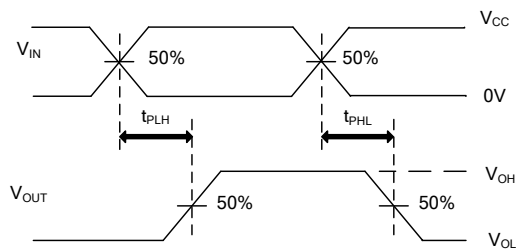
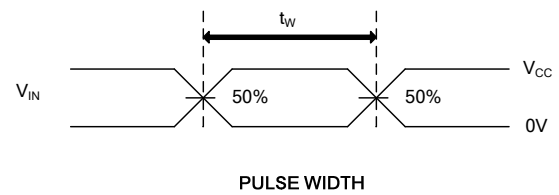
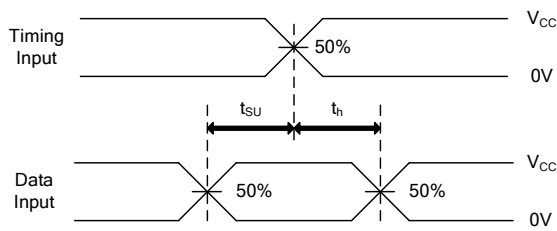
■ **OPERATING CHARACTERISTICS** (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load		100		pF

■ TEST CIRCUIT AND WAVEFORMS



TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	V_{CC}



Note: CL includes probe and jig capacitance.
 $PRR \leq 1\text{MHz}$, $Z_O = 50\Omega$, $t_R \leq 6\text{ns}$, $t_F \leq 6\text{ns}$.

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